MOBILE RADIO

LBI31360B

# PHOENIX-SX

with

## SIXTEEN CHANNEL DUAL PRIORITY SCAN PROGRAMMING INSTRUCTIONS USING 4EX22A10 PROGRAMMER

GENERAL ELECTRIC

## TABLE OF CONTENTS

DESCRIPTION ..... 1

TO PROGRAM PHOENIX-SX WITH SCAN

Preparation ..... 1

Programming Procedures ..... 1

Programming Number of Channels ..... 1

Programming Scan Option ..... 1

Programming Priority Channel ..... 2

Programming CCT Time Out ..... 2

Programming Squelch Tail Elimination ..... 2

Programming Channel Guard ..... 2

Sample Worksheets ..... 5-6

### TABLES

1. Channel Address ..... 2
2. Tone Channel Guard/STE ..... 2
3a. CCT Enable/Disable Code ..... 3
3b. CCT Delay Code ..... 3
4. Channel Code ..... 3
5. Decimal - Hex Conversion ..... 3
6. SCAN Option ..... 3
7. Priority Channel ..... 3

RF FREQUENCIES

8a. VHF Wideband: 136-174 MHz (6.25 kHz divisor) ..... 7
8b. VHF Wideband: 150-162 MHz (5 kHz divisor) ..... 39
8c. UHF Wideband: 403-512 MHz (12.5 kHz divisor) ..... 47
8d. VHF Wideband: 136-153 MHz (5 kHz divisor) ..... 95-106

Extra Worksheets (4)

ECR-3074

NOTE

IT IS THE RESPONSIBILITY OF THE INDIVIDUAL WHO INSTALLS ANY RADIO EQUIPMENT TO CONFIRM THAT THE OPERATOR OF THE EQUIPMENT IS LEGALLY LICENSED FOR THE USE OF THE FREQUENCIES WHICH ARE PROGRAMMED INTO THE RADIO.

GENERAL ELECTRIC COMPANY, MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS, LYNCHBURG, VIRGINIA 24502 U.S.A.

GENERAL ELECTRIC

U.S.A.



Copyright© March 1985, General Electric Company

## DESCRIPTION

These instructions are to be used in conjunction with the instructions for the 4EX22A10 EEPROM Programmer (LBI31189). The worksheets, tables and examples in this manual are for programming Phoenix-SX SCAN field-programmable radios. While much of the data may also pertain to other radios, there are some differences. For this reason, the data and procedures should be used for programming ONLY Phoenix-SX SCAN radios.

## TO PROGRAM PHOENIX-SX WITH SCAN

### Preparation

1. The radio must be turned OFF.
2. Remove the cover. Remove option board, if present.
3. Plug P1 (10-pin connector) and P2 (11-pin connector) onto the pins of J802 located on either side of EEPROM U805 and extending above it. Note the orientation notch on the plug labels and the notch on U805.
4. Turn the radio ON to provide power.
5. Set the Prom Switch S6 on the Programmer to PROM 1.

You may now begin programming the radio.

### PROGRAMMING PROCEDURE
(See Example Worksheet)

1. Determine and record the Scan Option, Priority Channel, CG Tone Frequency (with or w/o STE), the RF (RX & TX) Frequencies and the CCT delay for each channel to be programmed on the worksheet.

> NOTE
> CCT delay is the same for all channels but CCT can be enabled or disabled on a channel by channel basis.

2. Look up Hex codes in tables and record on worksheet.

> NOTE
> The reference divisor (0.005 MHz 0.00625 or 0.0125 MHz) listed at the top of Table 8 MUST be the same for Transmit and Receive for any given channel.

3. Set PROM Switch (S6) to 1.
4. Set Channel Address (S3).
5. Set Function Address (S4).
6. Set Data Hex Code in column below it with (S5).
7. Push (S1) to write Data in Memory.
8. Repeat steps 5 thru 7, digit by digit, as often as needed to write the data for that channel.
9. Move to next channel by advancing S3 and repeating the above procedure 4 thru 8 entering data.
10. When all channels have been written, push (S2) to store data permanently in radio.
11. Turn the radio off and remove programmer.
12. Test radio to assure proper programming.

### Number of Channels

Program the number of channels in the radio to limit EEPROM search.

Put the Hexadecimal code (Table 4) in the (#) position on the worksheet.

### SCAN Option

One of three Scanning options may be programmed. These HEX codes are determined from Table 6.

- Front Programmable allows the user to select the Level 1 Priority channel.
- Fixed Priority option fixes the Level 1 Priority channel in the EEPROM.
- The third option selects the Level 1 Priority channel to the SELECTED channel.

The Scan option HEX code must be programmed in the channnel 16 (%) position on the worksheet.

### Priority Channel

If the SCAN option "FIXED PRIORITY" is chosen, the Priority channel must be programmed in the channel 4 (!) position on the worksheet from Table 7. If the "FIXED PRIORITY" option is not chosen, program this position to 00HEX (0).

Special Code (#) on the worksheet in the channel 14 position must be programmed to 00HEX (0). All other Special Code positions should be programmed to 00HEX (0).

### CCT Enable/Disable Bit Code (Table 3-A)

The CCT enable/disable bit code is entered under Transmit Functions (CCT) on the worksheet. See example calculation.

Since the CCT enable/disable bit code position (8) is also a frequency bit code address, the two bit codes will need to be combined as shown below:

1. From Table 8-C, select the HEX code for 466.025 MHz. (HEX = 83222) The first frequency bit code is the 8.

2. From Table 3-A, select the HEX code for CCT enable. (HEX = 4).

3. Find the sum of the two and convert back to HEX.

| | | |
|---|---|---|
| 1st bit code for TX FREQ | 8 | (Table 8) |
| CCT bit code | 4 | (Table 3-A) |
| | 12 | |
| 12 converted to HEX = | C | (Table 5) |

4. Enter C on S5 for the first bit of the TX FREQ code.

This must be done for each active channel in the radio.

## CCT Delay Bit Code (Table 3-B)

The CCT delay bit code must be programmed in the channel 15 (*) on the worksheet. Get the CCT delay code from Table 3-B.

## Channel Guard

The Channel Guard may be selected on a channel by channel basis in two configurations, such as:

- No Channel Guard
- Tone Channel Guard

The HEX codes for Channel Guard Tones are found in Table 2.

## Squelch Tail Elimination

The Phoenix-SX SCAN radios are shipped with Squelch Tail Elimination (STE) disabled. STE may be enabled/disabled on a per channel basis using the HEX codes in Table 2.

## Disable Transmitter

"Open" transmit or receive channels may be programmed. When a receive channel is blank, the receiver will stay muted. When a transmit channnel is blank, the transmitter is disabled. To program an open channel, the data address under the function 5/D (RX & TX) is set to F. The remaining four data addresses no longer have any effect.

TABLE 1

CHANNEL ADDRESS

| CHANNEL | ADDRESS | CHANNEL | ADDRESS |
|---|---|---|---|
| 1 | 1 | 9 | 9 |
| 2 | 2 | 10 | A |
| 3 | 3 | 11 | B |
| 4 | 4 | 12 | C |
| 5 | 5 | 13 | D |
| 6 | 6 | 14 | E |
| 7 | 7 | 15 | F |
| 8 | 8 | 16 | 0 |

TABLE 2
TONE CHANNEL GUARD DATA

| TONE FREQ RX / TX | HEX CODE STE DISABLE 6 | 7 | STE ENABLE 6 | 7 |
|---|---|---|---|---|
| | E | F | E | F |
| NO CG | 0 | 0 | | |
| 67.0 | 1 | 0 | 1 | 8 |
| 71.9 | 2 | 0 | 2 | 8 |
| 74.4 | 3 | 0 | 3 | 8 |
| 77.0 | 4 | 0 | 4 | 8 |
| 79.7 | 5 | 0 | 5 | 8 |
| 82.5 | 6 | 0 | 6 | 8 |
| 85.4 | 7 | 0 | 7 | 8 |
| 88.5 | 8 | 0 | 8 | 8 |
| 91.5 | 9 | 0 | 9 | 8 |
| 94.8 | A | 0 | A | 8 |
| 97.4 | 1 | 2 | 1 | A |
| 100.0 | B | 0 | B | 8 |
| 103.5 | C | 0 | C | 8 |
| 107.2 | D | 0 | D | 8 |
| 110.9 | E | 0 | E | 8 |
| 114.8 | F | 0 | F | 8 |
| 118.8 | 0 | 1 | 0 | 9 |
| 123.0 | 1 | 1 | 1 | 9 |
| 127.3 | 2 | 1 | 2 | 9 |
| 131.8 | 3 | 1 | 3 | 9 |
| 136.5 | 4 | 1 | 4 | 9 |
| 141.3 | 5 | 1 | 5 | 9 |
| 146.2 | 6 | 1 | 6 | 9 |
| 151.4 | 7 | 1 | 7 | 9 |
| 156.7 | 8 | 1 | 8 | 9 |
| 162.2 | 9 | 1 | 9 | 9 |
| 167.9 | A | 1 | A | 9 |
| 173.8 | B | 1 | B | 9 |
| 179.9 | C | 1 | C | 9 |
| 186.2 | D | 1 | D | 9 |
| 192.8 | E | 1 | E | 9 |
| 203.5 | F | 1 | F | 9 |
| 210.7 | 0 | 2 | 0 | A |

TABLE 3-A

CARRIER CONTROLLED TIMER (CCT)

| | HEX |
|---|---|
| CCT Enabled | 4 |
| CCT Disabled | 0 |

TABLE 3-B

CARRIER CONTROLLED TIMER (CCT)

| CCT TIME OUT DELAY (MINUTES:SECONDS) | HEX CODE |
|---|---|
| 0:30 | 0 |
| 1:00 | 1 |
| 1:30 | 2 |
| 2:00 | 3 |
| 2:30 | 4 |
| 3:00 | 5 |
| 3:30 | 6 |
| 4:00 | 7 |

TABLE 4

CHANNEL CODE

| NUMBER OF CHANNELS | HEX CODE |
|---|---|
| 1 | 0 |
| 2 | 1 |
| 3 | 2 |
| 4 | 3 |
| 5 | 4 |
| 6 | 5 |
| 7 | 6 |
| 8 | 7 |
| 9 | 8 |
| 10 | 9 |
| 11 | A |
| 12 | B |
| 13 | C |
| 14 | D |
| 15 | E |
| 16 | F |

TABLE 5

DECIMAL - HEX EQUIVALENTS

| DECIMAL | HEX |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |
| 9 | 9 |
| 10 | A |
| 11 | B |
| 12 | C |
| 13 | D |
| 14 | E |
| 15 | F |

TABLE 6

SCAN OPTION

| SCAN OPTION | HEX CODE |
|---|---|
| FRONT PROGRAMMABLE | F |
| FIXED PRIORITY | 0 |
| FIXED PRIORITY To follow Selected Channel | 1 |

TABLE 7

PRIORITY CHANNEL

| PRIORITY CHANNEL | HEX CODE |
|---|---|
| 1 | 0 |
| 2 | 1 |
| 3 | 2 |
| 4 | 3 |
| 5 | 4 |
| 6 | 5 |
| 7 | 6 |
| 8 | 7 |
| 9 | 8 |
| 10 | 9 |
| 11 | A |
| 12 | B |
| 13 | C |
| 14 | D |
| 15 | E |
| 16 | F |

# PROGRAMMING WORKSHEET
## PHOENIX-SX SCAN
## CHANNEL 1 - 8

| | Chan Addr | Receive Functions (Frequency) (CG) | | | | | | | | Chan Addr | Transmit Functions (Frequency) (CG) | | | | | | | | | Set |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Special Code | | | | | | | | | Special Code | (CCT) | | | | | | | | |
| | (S3) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | (S3) | 8 | 9 | A | B | C | D | E | F | ← | S4 |
| Channel 1 | 1 | | | | | | | | | 1 | | | | | | | | | ← | S5 |
| Channel 2 | 2 | | | | | | | | | 2 | | | | | | | | | ← | S5 |
| Channel 3 | 3 | | | | | | | | | 3 | | | | | | | | | ← | S5 |
| Channel 4 | 4 | ! | | | | | | | | 4 | | | | | | | | | ← | S5 |
| Channel 5 | 5 | | | | | | | | | 5 | | | | | | | | | ← | S5 |
| Channel 6 | 6 | | | | | | | | | 6 | | | | | | | | | ← | S5 |
| Channel 7 | 7 | | | | | | | | | 7 | | | | | | | | | ← | S5 |
| Channel 8 | 8 | @ | | | | | | | | 8 | | | | | | | | | ← | S5 |

! PRIORITY channel number for "FIXED PRIORITY" (Table 7)
@ Number of channels in radio (Table 4)

Channel Address - Table 1, Channel Guard - Table 2, CCT - Table 3, Scan Option - Table 6, Priority Channel - Table 7, RF Frequency (RX & TX) - Table 8.

1. Determine and record the Channel Guard Frequency, Scan Option, Priority Channel, RF Frequencies (RX & TX) and CCT time for each channel to be programmed on the worksheet.
2. Look up HEX codes in tables and record on worksheet.
3. Set PROM Switch (S6) to 1.
4. Set Channel Address (S3).
5. Set Function Address (S4) and Data HEX code in column below it with (S5). Push (S1) to write Date in Memory.

# PROGRAMMING WORKSHEET
## PHOENIX-SX SCAN
## CHANNEL 9 - 16

| | Chan Addr | Receive Functions (Frequency) (CG) | Chan Addr | Transmit Functions (Frequency) (CG) | Set |
|---|---|---|---|---|---|
| | (S3) | Special Code: 0 1 2 3 4 5 6 7 | (S3) | Special Code: (CCT) 8 9 A B C D E F | ← S4 |
| Channel 9 | 9 | | 9 | | ← S5 |
| Channel 10 | A | | A | | ← S5 |
| Channel 11 | B | | B | | ← S5 |
| Channel 12 | C | | C | | ← S5 |
| Channel 13 | D | | D | | ← S5 |
| Channel 14 | E | # | E | | ← S5 |
| Channel 15 | F | | F | * | ← S5 |
| Channel 16 | 0 | % | 0 | | ← S5 |

**# PRIORITY Channel Special Code**
**% Scan Option HEX code (Table 6)**
*** CCT time HEX code (Table 3-B)**

Channel Address - Table 1, Channel Guard - Table 2, CCT - Table 3, Scan Option - Table 6, Priority Channel - Table 7, RF Frequency (RX & TX) - Table 8.

6. Repeat step (5) digit by digit as often as needed to write the data for that channel. Move to next channel and enter data.
7. When all channels have been written, push (S2) to store data permanently in radio.
8. Test radio to assure proper programming.